

**ABSTRACT OF THE DISCLOSURE**

A chemical-mechanical jet etching method rapidly removes large amounts of material in wafer thinning, or produces large-scale features on a silicon wafer, gallium arsenide substrate, or similar flat semiconductor workpiece, at etch rates in the range of 10-100 microns of workpiece thickness per minute. A nozzle or array of nozzles, optionally including a dual-orifice nozzle, delivers a high-pressure jet of machining etchant fluid to the surface of the workpiece. The machining etchant comprises a liquid or gas, carrying particulate material. The liquid may be a chemical etchant, or a solvent for a chemical etchant, if desired. The areas which are not to be etched may be shielded from the jet by a patterned mask, or the jet may be directed at areas from which material is to be removed, as in wafer thinning or direct writing, depending on the size of the desired feature or etched area.